

5 CLAIMS

1. An integrated module that is part of a solid oxide fuel cell system having a fuel intake, an air intake and a cathode exhaust and an anode exhaust, the module comprises a fuel processor, afterburner and a heat exchanger, wherein:

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(a) said afterburner comprises an igniter and functions to burn exhaust gases from the anode exhaust or the anode and cathode exhaust;

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(b) said fuel processor derives heat from the afterburner and contains a catalyst to steam reform raw fuel to a hydrogen rich fuel stream suitable for use in fuel cells; and

(c) said heat exchanger functional for preheating the input air and fuel streams, and for extracting waste heat from the exhaust stream.

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2. An integrated module for use with a SOFC system having an intake fuel stream, an intake air stream, a cathode exhaust stream and an anode exhaust stream, said module comprising:

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(a) an inlet for accepting the cathode and anode exhaust streams from the SOFC;

(b) a combustion chamber in fluid communication with the exhaust stream inlet comprising an igniter and an exhaust;

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(c) a heat exchanger associated with the combustion chamber for transferring heat from the combustion chamber to the intake air stream of the SOFC; and

(d) a prereformer associated with the combustion chamber comprising a source of water in liquid or gaseous form and a steam reforming catalyst wherein the intake

5 fuel stream is combined with water, heated and passed over the catalyst within the prereformer to enrich the fuel in hydrogen prior to entering the SOFC.

3. A method of extracting energy from the exhaust of a SOFC comprising the steps of :

10 (a) burning unused fuel from the exhaust stream to produce heat;

(b) using the heat produced in step (a) to preheat the intake air streams into the SOFC; and

15 (c) using the heat produced in step (a) to heat the intake fuel stream in the presence of a reforming catalyst and steam to enrich the fuel stream with hydrogen.

4. The method of claim 3 wherein the method is implemented in an integrated module comprising an afterburner for implementing step (a), a heat exchanger for
20 implementing step (b) and a fuel processor for implementing step (c).